

## CLAIMS

### WHAT IS CLAIMED IS:

1. A fragmentation-resistant instrument panel for use in a vehicle having an air bag, comprising:
  - (a) an outer layer having an inner surface;
  - (b) a core of expanded plastic foam of a predetermined shape and having an inner surface, said core secured to the inner surface of the outer layer;
  - (c) an inner layer having an inner surface fixedly secured to the inner surface of said core to thereby at least partially encapsulate said expanded plastic foam between the inner layer and said outer layer; and
  - (d) an inverted, generally V-shaped groove in the core of expanded plastic, said V-shaped groove having an open side open to the inner surface of the inner layer and a closed side adjacent to the inner surface of the outer layer;

whereby said instrument panel will be resistant to fragmentation in the event that an impact force is applied to said inner layer and the V-shaped groove provides for a hinge point when the air bag is deployed such that the instrument panel directs the air bag toward a vehicle occupant.

2. The fragmentation-resistant instrument panel of Claim 1 wherein said expanded plastic foam comprises a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

3. The fragmentation-resistant instrument panel of Claim 1, wherein said outer layer comprises a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

4. The fragmentation-resistant instrument panel of Claim 2, wherein said outer layer comprises a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

5. The fragmentation-resistant instrument panel of Claim 1, additionally comprising an expandable air bag forming a portion of a supplemental restraint system mounted adjacent said inner layer.

6. The fragmentation-resistant instrument panel of Claim 1, wherein the inner layer is a thermoplastic film material.

7. The fragmentation-resistant instrument panel of Claim 1, wherein the inner layer is reinforced with one or more textiles.

8. A method of manufacturing a fragmentation-resistant instrument panel for use in a vehicle having an air bag, comprising the steps of:

- (a) providing an outer layer having an inner surface;
- (b) molding a plurality of plastic beads into an expanded plastic foam core of a predetermined shape and having an inner surface;
- (c) securing the core of expanded plastic foam to the inner surface of the outer layer; and
- (d) fixedly securing an inner layer of material onto the inner surface of the core, to thereby at least partially encapsulate the expanded plastic foam between it and the outer layer;
- (e) said predetermined shape including an inverted, generally V-shaped groove in the core, said V-shaped groove having an open side open to the inner surface of the inner layer and a closed side adjacent to the inner surface of the outerlayer;

whereby the instrument panel will be resistant to fragmentation in the event that an impact force is applied to the inner layer and the V-shaped groove provides for a hinge point when the air bag is deployed such that the instrument panel directs the air bag toward a vehicle occupant.

9. The method of Claim 8, wherein the step of molding a plurality of plastic beads into an expanded plastic foam comprises molding a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

10. The method of Claim 8, wherein the steps of molding a plurality of plastic beads into an expanded plastic foam core and securing the core of expanded plastic foam to the inner surface of the outer layer occur in a single step using a steam chest molding process.

11. The method of Claim 8, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

12. An instrument panel for use in a vehicle having an air bag, comprising:

- (a) an outer layer having an inner surface;
- (b) a core of expanded plastic of a predetermined shape and having an inner surface, said core secured to said inner surface of said outer layer; and
- (c) said predetermined shape including an inverted, generally V-shaped groove in the core of expanded plastic, said V-shaped groove having an open side and a closed side, said closed side adjacent to the inner surface of the outer layer;

whereby said inner layer and the V-shaped groove provides for a hinge point when the air bag is deployed such that the instrument panel directs the air bag toward a vehicle occupant.

13. The method of Claim 12, wherein the step of molding a plurality of plastic beads into an expanded plastic foam comprises molding a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

14. The method of Claim 12, wherein the steps of molding a plurality of plastic beads into an expanded plastic foam core and securing the core of expanded plastic foam to the inner surface of the outer layer occur in a single step using a steam chest molding process.

15. The method of Claim 12, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.

16. A method of manufacturing an instrument panel for use in a vehicle having an air bag, comprising the steps of:

- (a) providing an outer layer having an inner surface;
- (b) molding a plurality of plastic beads into an expanded plastic foam core of a predetermined shape and having an inner surface;

- (c) securing the core of expanded plastic foam to the inner surface of the outer layer; and
- (e) said predetermined shape including an inverted, generally V-shaped groove in the core of expanded plastic, said V-shaped groove having an open side and a closed side adjacent to the inner surface of the outerlayer;

whereby the V-shaped groove provides for a hinge point when the air bag is deployed such that the instrument panel directs the air bag toward a vehicle occupant.

17. The method of Claim 16, wherein the step of molding a plurality of plastic beads into an expanded plastic foam comprises molding a plurality of small polypropylene beads that are joined to one another by the application of heat thereto.

18. The method of Claim 16, wherein the steps of molding a plurality of plastic beads into an expanded plastic foam core and securing the core of expanded plastic foam to the inner surface of the outer layer occur in a single step using a steam chest molding process.

19. The method of Claim 16, wherein the step of providing the outer layer comprises providing a material selected from the group consisting of textiles, thermoplastic polyolefins and polyvinylchloride.